

REMARKS

Claim 1 has been amended to call for using voltage contrast-based defect inspection. None of the cited references use such an operation. Basically, they either are non-specific or do resistance measurements. For example, Oda is explicit that he uses resistance measurements. See paragraph 176. Likewise, Sugawara is explicit that he uses resistance measurements in column 11, lines 37-45.

With the claimed voltage contrast method, no bottom contact is needed underneath the contact fill. Instead, as explained on page 3 of the present application, a charge may be induced on the surface of the wafer, for example, by an electron beam. Trenches with good fill dissipate the surface charge. A secondary electron image of the wafer is generated using scanning electron microscopy or an electron beam wafer inspection. The defective trenches are visually distinct from good trenches.

In view of these remarks, reconsideration is respectfully requested.

Claim 9 calls for applying an etching solution to the conductive material formed in an aperture “to determine whether the conductive material is defective.” This is in contradistinction to the cited references which apply a material to their structure in the course of etching that structure, for example, as part of a CMP operation. In other words, the damage occurs unintentionally.

In the present application, the damage is produced intentionally in order to identify defective contact fills. Such a concept is nowhere suggested in the cited references.

Therefore, reconsideration of the rejection of claim 9 is respectfully requested.

Claim 11 calls for applying an etching solution which characteristically etches underneath the conductive material if the conductive material is defective. No such operation occurs in the cited references. They use for etching, that material they need to implement, for example, a CMP operation. There is no effort to find the material that provides a characteristic structure underneath the contact fill when the fill is defective. For example, as shown in the present application, a V-shaped structure, which may be visually detected, may be etched.

Therefore, reconsideration of the rejection of claim 11 is respectfully requested.

Similarly, claim 13 calls for using a material which preferentially etches along a specific crystallographic direction. In both references, no such feature is ever taught for the same reason described above. The etchant is selected to do the job, not to expose poor contact fill.

Similarly, claim 14 calls for the formation of a V-shaped trench which is nowhere suggested in the prior art.

Claim 16 calls for using contrast-based defect inspection, again, which is nowhere suggested in the cited reference.

Claim 19 calls for using secondary electron image to determine if the material is defective. Again, the cited references use resistance measurements.

Claim 20 calls for forming a characteristic V-shaped pattern underneath the etched contact. As described above, no such structure is provided.

In view of these remarks, the application should now be in condition for allowance.

Respectfully submitted,

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